

ABSTRACT OF THE DISCLOSURE

A new high resolution confocal and non-confocal scanning laser microscope is disclosed which achieves fine focus and control of focus position by moving a lens in the intermediate optics. This arrangement is particularly useful for imaging specimens where it is difficult to focus by changing the distance between the scan lens and the specimen, for example for in-vivo imaging, photodynamic therapy, and image-guided surgery. It is also important to keep the lens-to-specimen distance constant when a liquid-immersion scan lens is used, in order to maintain a constant thickness of liquid between the lens and the specimen. In addition to being useful for confocal slicing, motion of the intermediate lens under computer control also enables dynamic focus and the ability to move the focal spot along a general path inside the specimen. Several applications of the imaging system are described. The microscope images macroscopic specimens in reflected light, transmitted light, fluorescence, photoluminescence and multi-photon fluorescence.